excitation. Fortunately, Professor J. A. Detlefsen, who has cooperated with the writer ever since the first cases of disequilibration appeared, is able to devote a sabbatical year at the Wistar Institute to the further investigation of the facts above described.

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THE USEFULNESS OF ANALYTIC ABSTRACTS

THE various ways in which preliminary abstracts should be of service to scientific readers were pointed out about a year ago[1], but whether such abstracts as actually prepared and published would be worth while could be determined only by experiment. This has been done. After analytic abstracts had been appearing in the *Astrophysical Journal* and the *Physical Review*[2] for over two years the following return post-card questionnaire was sent by the chairman of the Division of Physical Sciences of the National Research Council to each reader, with the request that he underscore in each parenthesis the word or words which represent his answer to the question implied:

I look through (the *Astrophysical Journal*, the *Physical Review*) regularly. Before reading the articles, I read the abstracts (always, usually, sometimes, seldom, never). Instead of reading the articles, I read the abstracts in (many, some, few, no) cases. The abstracts have helped me understand the articles in (some, few, no) cases. The abstracts have proved useful in locating information in (some, few, no) cases. I read the subtitles in the abstracts first (sometimes, never). I find the subtitles of value as an index of the abstract (sometimes, never). The abstracts in general give (too much, too little, about enough) information. I think they should be continued (yes, no).

I have the following suggestions to make:

[1] "Scientific Abstracting" by G. S. Fulcher, SCIENCE 54, 291, September 30, 1921.

[2] The preliminary abstracts in the *Physical Review* are called "Synopses" to distinguish them from the abstracts of papers presented at meetings which are printed in connection with the proceedings of the Society.

Replies were received from 805 readers, including 83 readers of the *Astrophysical Journal*, 502 readers of the *Physical Review*, and 220 readers of both. Although the answers from the three groups have been tabulated separately, the results are so nearly the same for each that only the results for all readers, that is, the percentages of all readers answering each question in each alternative way, will be given here. Since some replies are incomplete, the sum of the percentages is usually less than 100.

1. How frequently are the abstracts read before the articles?

always	by	41.9	per cent. of readers.
usually	by	45.9	per cent. of readers.
sometimes	by	9.9	per cent. of readers.
seldom	by	2.1	per cent. of readers.
never	by	0.2	per cent. of readers.
		100.0	per cent.

2. How many abstracts are read instead of the articles?

many	by	44.5	per cent. of readers.
some	by	39.7	per cent. of readers.
few	by	9.5	per cent. of readers.
none	by	2.6	per cent. of readers.
		96.3	per cent.

3. How many abstracts helped in understanding the articles?

some helped	58.1	per cent. of readers.
few helped	17.7	per cent. of readers.
none helped	11.8	per cent. of readers.
	87.6	per cent.

4. How many abstracts have proved useful in locating information?

some useful to	59.3	per cent. of readers.
few useful to	16.6	per cent. of readers.
none useful to	11.4	per cent. of readers.
	87.3	per cent.

5. Should the abstracts be continued?

yes	92.8	per cent. of readers.
no	4.0	per cent. of readers.
	96.8	per cent.

Since the abstracts are read, always or usually, by 88 per cent. of the readers; are read

instead of many of the articles by 45 per cent.; and have been found helpful in other ways by 59 per cent., they have evidently proved of decided value. In what ways? According to the testimony of the readers: "They are great time savers"; "They frequently give all information necessary about the articles"; "They double a man's range of reading." Moreover, the abstracts have been copied verbatim in *Science Abstracts* and have thus reduced the labor of preparing that abstract journal by ten per cent. The abstracts have therefore to some extent fulfilled their purpose of saving the time of scientific men.

How about other sciences? Are astronomy and physics essentially different from chemistry, botany, zoology, geology, physiology, etc., in their methods of disseminating scientific information? If 93 per cent. of the readers of these astronomical and physical journals find that preliminary abstracts are useful to them, would not the great majority of other scientific readers also find such abstracts useful? The responsibility resting upon the editors of other scientific journals is clear.

Now as to the nature of the abstracts which should be provided. The abstracts which have been appearing in the *Astrophysical Journal* and *Physical Review* are of the analytic type developed by the National Research Council.[3] They aim to give a complete description and adequate summary of the results reported in each article. The replies to the question:

6. Is the amount of information given, in general, about enough, too little, or too much?

about enough	79.8 per cent. of readers.
too little	6.7 per cent. of readers.
too much	4.8 per cent. of readers.
	91.3 per cent.

these replies indicate that the abstracts, averaging from 5 to 6 per cent. of the articles, have been of about the right length, and it is not believed they could be made much shorter without considerably decreasing their value.

A distinctive feature of the abstracts is that they contain italicized subtitles which give the various subjects involved more completely and precisely than in general it is possible for the author's titles to do. One purpose of these subtitles is to enable a reader who is not interested in the subject indicated by the author's title to determine by glancing through the subtitles whether something of interest to him has not been incidentally included. Until readers became accustomed to these subtitles, however, it was to be expected that most readers would consider them more of an annoyance than a help; but the following replies show that a surprising percentage of the readers have already found the subtitles useful:

7. Do you ever read the subtitles in the abstracts first?

sometimes	64.1 per cent. of readers.
never	17.5 per cent. of readers.
	81.6 per cent.

8. Do you ever find the subtitles of value as an index of the abstract?

sometimes	63.0 per cent. of readers.
never	12.7 per cent. of readers.
	75.7 per cent.

Since the subtitles also serve the purpose of assisting in the compilation of a complete subject index and tend to insure more complete abstracts, it is believed this feature should be retained. Only three readers definitely objected to the form of the analytic abstracts.

It is the practice of both these journals to submit all authors' abstracts to an abstract editor to be revised or if necessary rewritten, in conformity with the standards adopted. While a few authors have objected to having their abstracts "robbed of individuality," a number of readers specially called attention to the importance of having the abstracts edited so that a uniform standard might be maintained. It can safely be affirmed that since most authors are inexperienced in writing abstracts and also differ widely in their ideas of the function of the abstract, authors' abstracts if not thoroughly edited are sure to fall far short of rendering the service which preliminary abstracts should render, even if detailed instructions are furnished. But after the edited abstracts begin to appear regularly, they

[3] Described in "Scientific Abstracting" referred to above.

gradually establish a standard to which authors will conform more and more closely as time goes on, and therefore the amount of editing required will become less and less.

Finally, mention should be made of the suggestion of several readers that larger type be used for the abstracts than has been the custom. Since more people read the abstracts than read the articles, it would seem obvious that the type of the abstracts should be at least as large as that of the articles.

It should not be long before all scientific journals, in fulfilment of their duty toward their readers, provide carefully prepared preliminary abstracts of their scientific articles. There can no longer be any doubt of the value of such abstracts. It remains only to overcome the practical obstacles to the introduction of the new policy.

In conclusion we desire to express our thanks to the 805 readers whose cooperation gave us the information herewith reported.

GORDON S. FULCHER
CORNING GLASS WORKS

SCIENTIFIC EVENTS

CONSERVATION OF THE RESOURCES OF THE PACIFIC

The following resolutions were unanimously adopted by the Pan-Pacific Union Commercial Conference, meeting at Honolulu on November 7, 1922:

Whereas, It is known that many valuable species of marine mammals such as fur seal, sea otters, elephant seals and whale, and many species of important food fishes such as salmon and halibut, formerly occurred in the Pacific in such vast numbers as to constitute the objects of fisheries whose annual products were worth more than one hundred million dollars, and

Whereas, Nearly all of those great natural resources have been seriously depleted, many of them even to commercial extinction, through greed and short-sightedness and ill-considered fishery methods, and

Whereas, It is known that small remnants of fur-seal and sea-otter herds and small numbers of whales and of other commercially valuable species still remain in certain places, and

Whereas, The rapid recovery of the Alaska fur-seal herd in the short period of ten years from complete commercial ruin to an annual production of more than one million five hundred thousand dollars, as a result of the international fur-seal treaty of 1911, demonstrates conclusively the wonderful recuperative power of such depleted natural resources of the sea under international cooperation, and justifies the belief that other depleted fisheries can be rehabilitated through similar cooperation among the nations concerned, and

Whereas, It is conservatively estimated that these resources when rehabilitated will yield to the world a regular annual product of more than one half billion dollars in value, therefore be it

Resolved, That the Pan-Pacific Commercial Conference strongly recommends that the various countries bordering on, or interested in, the Pacific, take such steps as may be necessary to bring about an international treaty for the restoration of the vanishing resources of the Pacific to their former abundance, that they may be maintained for all time as the objects of great commercial fisheries of which they are easily capable, and be it further

Resolved, That this Commercial Conference recommends that the governments of the countries bordering on the Pacific enter into correspondence for the purpose of establishing an international commission for the scientific study of the biology, physics and chemistry of the Pacific in the interest of the restoration, proper utilization and conservation of its vanishing natural resources.

THE UNIVERSITY OF WYOMING AND DR. NELSON

THE trustees of the University of Wyoming have passed the following resolutions:

Whereas, Dr. Aven Nelson, after five years as president of the University of Wyoming, resigned at the June meeting of the board of trustees, and

Whereas, His activities as president ceased October 2, upon the arrival of his successor, Dr. Arthur G. Crane, of Edinboro, Pennsylvania, and

Whereas, Dr. Nelson has served this university in various capacities from the infancy of the institution, in all of which he has succeeded to a high degree, and

Whereas, His industry, his patience and his scholarship were controlling factors in carrying the University of Wyoming through the world war and the reconstruction period thereafter to its present success.